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EXAMINER	
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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Paper No. 11

Application Number: 10/057,025
Filing Date: January 24, 2002
Appellant(s): CHUNG ET AL.

Randy Tung
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 11/12/03.

(1) Real Party in Interest

A statement identifying the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

A statement identifying the related appeals and interferences which will directly affect or be directly affected by or have a bearing on the decision in the pending appeal is contained in the brief.

(3) Status of Claims

The statement of the status of the claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Invention

The summary of invention contained in the brief is correct.

(6) Issues

The appellant's statement of the issues in the brief is correct.

(7) Grouping of Claims

The rejection of claims 11-20 stand or fall together because appellant's brief does not include a statement that this grouping of claims does not stand or fall together and reasons in support thereof. See 37 CFR 1.192(c)(7).

(8) Claims Appealed

The copy of the appealed claims contained in the Appendix to the brief is correct.

(9) Prior Art of Record

4,914,562	Abe et al.	04/1990
6,214,245	Hawkins et al.	04/2001
5,308,442	Taub et al.	05/1994
6,267,471	Ramaswami et al.	07/2001
6,155.674	Figueredo et al.	12/2000

(10) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 11-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ramaswami et al (6,267,471) in view of Abe et al. (4,914,562), Figueredo et al. (6,155,674), Taub et al. (5,308,442) and Hawkins et al. (6,214,245).

Ramaswami et al. teaches (Fig. 4) a prior art ink jet print head comprising:

- A silicon substrate (202).
- A first insulating material layer that is made of silicon dioxide and which has a thickness of 10,000-24,000 angstroms (col. 28:49-67 and col. 29:1-7).

- Electrical interconnects (22), that are connected to a heater (210).
- A second insulating layer (230), that is formed on top of the heater.
- A photoresist layer (260), that is formed on top of the first insulating layer and which has a thickness of 50,000-300,000 angstroms (col. 35:1-48).
- An ink chamber (264), that is formed in the photoresist layer and is ink communication with an ink manifold.

Ramaswami et al. teaches the claimed invention, with the exception of a ring shaped heater, a funnel shaped manifold in the substrate, a metal seed layer on the first photoresistive layer, a nickel layer on top of the metal seed layer, the heater in the primary ink chamber being ring-shaped and the seed layer being either Ni or Cr.

Abe et al. teaches an ink jet print head comprising a ring shaped heater (Fig. 17(c)). A ring shaped heater provides the advantage of reducing cavitation damage, by allowing the shock wave generated by the collapse of the bubble to pass through the heater (col. 14:25-40). It would have been obvious to one of ordinary skill in the ink jet art at the time the invention was made, to have provided Ramaswami et al. with a ring shaped heater, in order to reduce cavitation damage, as taught by Abe et al.

The ink flow passage disclosed by the prior art of Ramaswami et al. is of the edge feed type, wherein ink flow from the side of the substrate. Figueredo et al. teaches that an edge feed type ink flow manifold and a center feed type ink manifold (where the ink is provided through an opening in the substrate) are art recognized equivalents (see Fig. 1 and 1A) for the purpose of supplying ink. Since these different types of ink manifolds where art recognized equivalents at the time the invention was

made, on of ordinary skill in the ink jet art would have found it obvious to have substituted a center feed type ink manifold for the edge feed ink manifold of Ramaswami et al., in order to supply ink in a known alternative manner.

Taub et al. teaches an ink jet print head having funnel shaped ink manifold formed therein. The use of a funnel shaped manifold provides increased flow capacity to adequately respond to ink volume demands (col. 1:56-59). It would have been obvious to one of ordinary skill in the ink jet art at the time the invention was made, to have provided Ramaswami et al., as modified by Figueredo et al., with a funnel shaped manifold for the purpose of adequately responding to ink volume demands, as taught by Taub et al.

Hawkins et al. teaches a method of forming an orifice plate for an ink jet print head wherein a Ni or Cr seed layer (444) is formed over a substrate and then a plate layer of nickel (446) is deposited over the seed layer, so that the seed layer and the plate layer form a nozzle plate (445) (col. 8:52-65). The use of the seed layer allows for the production of very small or critically dimensioned nozzle plates which are thin and flexible (col. 8:27-30). It would have been obvious to one of ordinary skill in the ink jet art at the time the invention was made, to have provided Ramaswami et al. with a metal seed layer on the first photoresistive layer, a nickel layer on top of the metal seed layer, for the purpose of making a nozzle plate that is very small or critically dimensioned and which is thin and flexible, as taught by Hawkins et al.

(11) Response to Argument

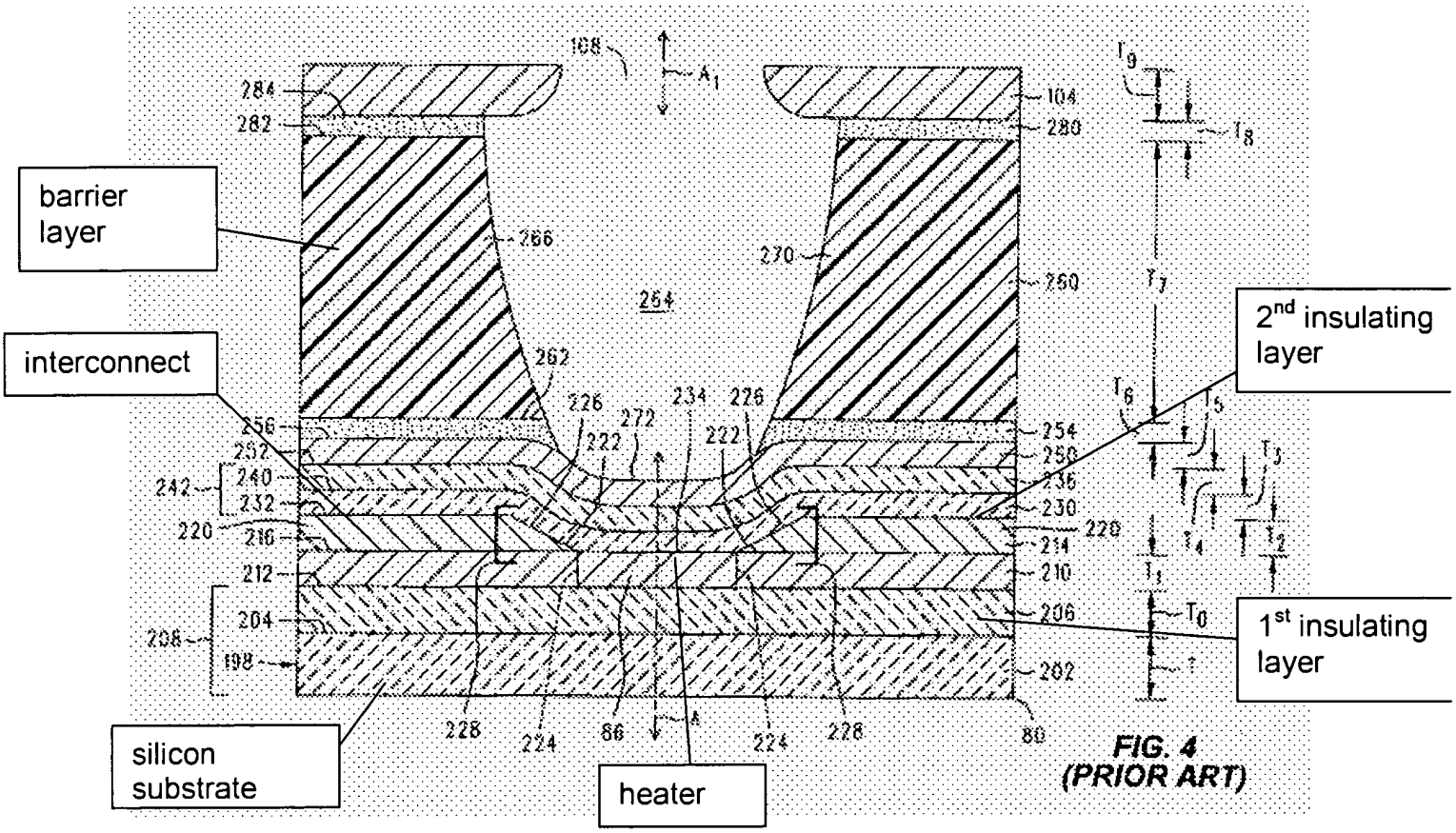

FIG. 4
(PRIOR ART)

The Appellant's argument that Ramaswami does not teach the funnel shaped manifold is correct. However, Ramaswami is not cited to teach this feature. Simply put, claim 11 is a combination of two basic ink jet print head structures: a substrate having an ink manifold for supplying ink to heater elements and a layered structure that is formed on the substrate and contains the ink ejection chamber and heater elements. Ramaswami is cited to teach the majority of the elements comprising the layered structure, not the specifics of the ink manifold. The specifics of the ink manifold are

taught by Figueredo and Taub. With regard to the ink manifold, Ramaswami teaches an "edge feed" type print head (col. 23:16-22). That is, the ink is fed from the sides of the substrate, rather than through an opening formed directly through the substrate (center feed type). Figueredo teaches a print head having a substrate (112) and a layered structure(e.g. Figs. 4 and) similar to the claimed invention and to Ramaswami. Figueredo teaches that this type of print head may use either an "edge feed" type manifold (Fig. 1) or a "center feed" type manifold (Fig. 1A), in order to supply in the to the heating resistors. Thus, these two ink manifold structures are known equivalents in the ink jet art. Accordingly, one of ordinary skill in the ink jet art would have found it obvious to substitute a "center feed" type manifold for the "edge feed" manifold of Ramaswami, for the purpose of supplying ink in a known alternative manner.

In the Appeal Brief (p. 6), the Appellant argues that Figueredo et al. teaches funnel-shaped ink channels in the barrier layer and thus, the funnel shaped manifold is not formed in the silicon substrate. It is apparent that the Appellant is confused as to which element is the ink manifold. The ink manifold is identified by Ref. No. 116 (see Fig. 1A). The Examiner acknowledges that this ink manifold is not funnel shaped. However, Taub is cited to teach why one of ordinary skill in the ink jet art would provide a funnel-shaped manifold in a print head structure that is similar to the claimed invention, Ramaswami and Figueredo. The Appellant does not provide any arguments as to why Taub does not teach a funnel-shaped ink manifold or as to why Taub can not be combined with the other prior art references.

Accordingly, it is the Examiners position that the combination of Ramaswami, Figueredo and Taub teach the claimed funnel shaped ink manifold.

The Appellant also argues that Ramaswami does not teach an ink chamber formed in a photoresist layer and in fluid communication with a funnel shaped manifold. This is not correct. Looking at Fig. 4 of Ramaswami, the ink chamber (264) is formed in a barrier layer (260) that is made of photoresist (col. 35:6-11). As discussed above, the ink chamber is in fluid communication with an ink manifold and the combination of the prior of record teaches the claimed funnel shape.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

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MSB
December 22, 2003

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